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Journal of the Society of Arts.

FRIDAY, OCTOBER 31, 1862.

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NOTICE TO MEMBERS.

The One-Hundred-and-Ninth Session of the Society will commence on Wednesday, the 19th November, at 8 o'clock, when Sir Thomas Phillips, F.G.S., Chairman of the Council, will deliver the Opening Address. The Chair will be taken at Eight o'clock on the following Wednesday Evenings:—

1862. November	—	—	19	26	
„ December	3	10	17	—	—
1863. January	—	14	21	28	
„ February	4	11	18	25	
„ March	4	11	18	25	
„ April	—	8	15	22	29
„ May	6	13	20	27	
„ June	—	—	—	24*	

For the Meetings previous to Christmas, the following arrangements have been made:—

November 19.—Opening Address by Sir Thomas Phillips, F.G.S., Chairman of the Council.

*** *On this evening the Medals which were awarded by the Council for Papers read at the Weekly Evening Meetings during the last Session, will be distributed.*

November 26.—"On the Utilization of Peat, with reference more particularly to the Manufacture of Hydro-Carbon Oils." By B. H. Paul, Ph.D.

December 3.—"On Thompson's Process of Boatbuilding by Machinery." By D. Puseley. Illustrated by Models.

December 10.—"On the Construction of Labourers' Cottages and Sanitary Building Appliances." By John Taylor, Jun., Architect.

December 17.—"On the Mines and Minerals of the United Kingdom." By Robert Hunt, F.R.S., Keeper of Mining Records, Government School of Mines.

General Index.

A general Index to the first ten volumes of the *Journal* will shortly be published, which should be bound with the present volume. Members who desire to have copies are requested to apply to the Secretary before the 1st of December, in order that a sufficient number may be printed.

INTERNATIONAL EXHIBITION of 1862.

REPORTS OF THE JURIES.

The Council of the Society of Arts have felt the importance of having some permanent and authoritative Record of the International Exhibition, and finding that Her Majesty's Commissioners have provided only for the publication of the awards of the Juries, but not of their Reports descriptive of the Progress of Industry since the Exhibition of 1851, the Council have undertaken this work, with the co-operation of Her Majesty's Commissioners and of the Juries, and have placed the matter in charge of Dr. Lyon Playfair, the Special Commissioner of the Juries.

The Reports will be published in super royal octavo, to range with the one-volume Jury Reports of 1851. The price of the volume, bound in cloth, to Members of the Society of Arts, to Jurors, and Guarantors, is fixed at 10s.; to other persons, 15s. If bound in morocco, 7s. 6d. additional in each case.

Forms of application for copies have been issued to Members of the Society, to Jurors, and to Guarantors.

It was the intention of the Council to issue the volume complete in the early part of September, but as several of the Reports have not yet been received by Her Majesty's Commissioners, the completion of the entire work has been unexpectedly delayed; the Council, however, unwilling to defer the publication of the Reports already completed, have issued to the subscribers those that have been received up to the present time. When all the Reports are delivered, the parts now issued to subscribers will be exchanged, if uninjured, for the perfect volume, bound or unbound, as desired. Individual reports are sold separately; for prices see advertisement.

INTERNATIONAL EXHIBITION OF 1862.—Visits of Schools.

The following is a continuation of the Schools reported to Her Majesty's Commissioners as having entered the Building from the 17th to the 25th of October:—

Date.	From what Locality.	Name of School.	By whom Sent.	No. of Children from each School.	Total each day.
Oct. 17	Homerton	British Asylum for Deaf and Dumb Females	J. G. Simpson, Esq.	16	16
„ 18	Hampstead	Teachers of National	Rev. W. Wignan	32	32
„ 20	Bedford	Union	Subscription	70	
„ „	Paddington	St. John's (Servants)	The Hon. Mrs. A. Kinnaird	25	
„ „	Bexley (Kent)	National	F. Dashwood, Esq.	97	
„ „	Coventry	Bablake	Trustees	73	
					265

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* The Annual General Meeting: the Chair will be taken at Four o'clock. No Visitors are admitted to this Meeting.

RETURN OF SCHOOLS (*Continued*).

DATE.	FROM WHAT LOCALITY.	NAME OF SCHOOL.	BY WHOM SENT.	No. of Children from each School.	Total each day.
,, 21	City of London.. ...	Foundation Girls, St. Dunstan's-in-the-West	Mr. Edmund Waller ...	11	
,, ,,	Wallingboro', near Northampton..	Union	Subscription	24	
,, ,,	St.George's-in-the-East	Raine's Asylum	The Trustees	39	
,, ,,	Shooters' Hill	National	Subscription	30	
,, ,,	Kilburn-park	Sunday	Subscription	50	
,, ,,	Kettering, near Northampton..	Grammar	Own Expense	23	
,, ,,	Essex...	Havering	S. C. Hope, Esq.	37	
,, ,,	Kettering, Northampton	Sunday	Subscription	20	
,, ,,	Snaresbrook	Merchant Seamen's Orphan Asylum	J. Adams, Esq.	13	
,, ,,	Kettering, Northampton	National	Rev. T. H. Madge	15	262
,, 22	St. George's, Hanover-square ...	United Day	Subscription	700	
,, ,,	St. James's, Westminster... ...	Burlington	Subscription	42	
,, ,,	St. George's, Hanover-square ...	Stewart's Foundation	Captain A. Stewart... ...	34	
,, ,,	City of London... ...	Bridge Ward	Subscription	33	
,, ,,	Bloomsbury	British	Subscription	48	
,, ,,	Royston (Herts) ...	Union	Subscription	33	
,, ,,	City of London... ...	Broad-street Ward	Subscription	102	
,, ,,	Halfway-street, Kent	Lamorly	Lady Louisa Mills	32	
,, ,,	Cranford, Middlesex...	Private	Rev. W. H. Hickiston ...	9	
,, ,,	Aldershott...	Choir Children of Royal Engineers and Military Train	Rev. J. C. Edghill	15	
,, ,,	Attleboro', Warwickshire ...	Teachers and Choir of Church Sunday	Subscription	34	1082
,, 23	Hounslow	National	Subscription	124	
,, ,,	Westminster	St. Margaret's	Churchwarden White ...	18	
,, ,,	Edmonton...	Latimer's	The Trustees	48	
,, ,,	Hampstead	Soldiers' Daughters' Home	Committee of Indian Mutiny Relief Fund	25	
,, ,,	Stockwell-green ...	British	Mr. Goodchild...	12	
,, ,,	Gloucester...	St. Mark's Choir	Subscription	16	
,, ,,	St. George's-in-the East	Plasket Industrial	Own Expense	27	
,, ,,		Choristers...	Subscription	35	
,, ,,	Market Harborough...	Sunday	Subscription	21	
,, ,,	Islington	Shoe-black Brigade...	Subscription	36	
,, ,,	Rye, Sussex	National	W.A. Mackinnon, Esq., M.P.	460	822
,, 25	Tulse-hill, Surrey ...	Grenada-house...	E. R. Shaw, Esq., B.A. ...	23	23

VISITS OF WORKMEN.

The following is a continuation of the return of the number of workmen, mechanics, operatives, and others who have visited the building from the 20th to the 25th of October:—

DATE.	DESCRIPTION OF PERSONS.	FROM WHAT LOCALITY.	BY WHOM SENT.	NUMBER.
Oct. 20	Packing-case Makers..	Old Bond-street..	Messrs. Harrow & Son... ...	20
,, ,,	Agricultural Labourers	Bodicote House, Oxon ...	W. Caliss, Esq.	17
,, ,,	Feather Dressers	Old Kent-road...	Ellington and Ridley	180
,, ,,	Drummers and Band Boys from various Regiments	Aldershott...	Rev. A. H. Hore...	31
,, ,,	Timber Merchants' Employés ...	Rotherhithe and Millwall..	H. P. Burt, Esq.	113
,, ,,	Workmen of the Parish	Marylebone..	The Vestry and Parishioners	240
,, 21	Farm Labourers..	Walesby, Lincolnshire ...	Mr. T. F. Kerman..	14
,, ,,	Hartley Bottle Company's Warehousemen	Upper Thames-street, City	The Company	26

VISITS OF WORKMEN (*Continued*).

DATE.	DESCRIPTION OF PERSONS.	FROM WHAT LOCALITY.	BY WHOM SENT.	NUMBER.
„ 21	Sieve makers	Long-lane, Boro'	Messrs. Bedford & Steer	71
„ „	Slate Workers	Stratford, Essex	A. A. Robinson, Esq.	71
„ 22	Agricultural Labourers	Mount Pleasant Farm, Buckland, Berks	Geo. Davy, Esq.	33
„ „	Agricultural Labourers	Buckland House, Berks	Sir Wm. Throckmorton, Bart.	70
„ „	Agricultural Labourers	Spray Farm, Hungerford	Henry Woodman, Esq.	41
„ „	Agricultural Labourers	Woolhampton House, Berks	James Blyth, Esq.	23
„ „	Estate Labourers	Harefield Grove	Robert Baines, Esq.	28
„ „	Tanners	Shrewsbury	James Cook, Esq.	26
„ „	Lead Workers	Shrewsbury	Messrs. Burr, Brothers	35
„ „	Labourers and Residents	Littletons Evesham, Worcester	Rev. H. G. Fawsett, Rev. S. Yorke, and H. Simpson, Esq.	38
„ „	Evening Class Students	King's College, Strand	Individual Subscription	30
„ „	Tenantry	Wilton	Lady Herbert	450
„ 23	Builders' Workmen	St. John's-wood	Mr. Richard Thomas	200
„ „	Glass Bottle Makers	Yorkshire	Aire and Calder Bottle Co.	340
„ „	Members of St. Mark's Working Men's Institute	North Audley-street	Subscription	25
„ „	Agricultural Labourers	Litsworth, Oxon	Wm. Hatton, Esq.	58
„ „	Music Publishers' Employés	New Burlington-street	Messrs. Robert Cocks and Co.	50
„ 24	Serjeants of the Coldstream Guards	Wellington Barracks	Lieut.-Colonel Dawkins	38
„ „	Clothiers' Warehousemen	Friday-street, City	J. C. Harvey	14
„ 25	Serjeants of the Coldstream Guards	Wellington Barracks	Lieut.-Colonel Dawkins	20

INTERNATIONAL EXHIBITION.

SURGICAL INSTRUMENTS, CLASS 17.

At a meeting of the Exhibitors, held on the 22nd inst., it was determined by the undersigned not to sell any of their goods in the Exhibition Building, and that a card be placed in each case to that effect:—

W. H. Bailey.
H. H. Bigg.
W. Cobs and Co.
James Coxeter.
W. F. Durroch.
F. G. Ernst.
Evans and Stevens.
John Evrard.
J. and J. Ferguson.
Gray and Halford.
W. R. Grossmith.
Mark Lindsey.
F. Longdon and Co.
W. Matthieu.
John Millikin.
Joseph Pratt.
Charles Rein.
H. Simpson.
W. H. Spratt.
Frederick Walters.
Thomas Weedon.
John Weiss and Son.
Whicker and Blaise.
John White.

PREVENTION OF DECAY IN TIMBER FOR SHIP-BUILDING AND OTHER PURPOSES.

An essay on the subject of Decay in Timber, and its prevention by a new system of carbonisation, has been recently published by M. de Lapparent, Inspector-General of Timber for the French Navy, and it is stated that the method of preservation therein described is extensively adopted at the present moment in the French Government dockyards for their line-of-battle ships, as well as by railway companies both in that country and Spain, for the preservation of their sleepers, &c. It has been thought that a translation of portions of this work would be interesting to the readers of the *Journal*:—

It is stated in the preface that it is a fact established by the agricultural statistics of France, that the annual consumption of timber in that country considerably exceeds the re-production, and, by the continued impoverishment of the land in that particular, not only are the interests of the agricultural and industrial population immediately affected, but their future requirements compromised and endangered.

Very few persons have even an approximate idea of the enormous consumption of timber which takes place annually in France. It is generally believed that the ship-builders are the principal consumers, and this would be true to a certain extent if it only related to timber of extraordinary or unusual dimensions; but as regards quantity, the consumption for shipping is almost insignificant, as evidenced by the summary of statistics given below, collected by an inspector of forests attached to the Central administration.

STATISTICAL SUMMARY OF THE ANNUAL CONSUMPTION OF TIMBER IN FRANCE.

	Cubic Metres.		Cubic Feet
Naval and Merchant service	80,000	or	2,825,328
Artillery and Engineers' do.	30,000	„	1,059,498
Railways	200,000	„	7,063,320
Buildings	1,600,000	„	56,506,560
Cooperage	1,600,000	„	56,506,560
Vine props	2,000,000	„	70,633,300

This statement does not comprise timber imported from abroad. It is at the outside a minimum; first, because it estimates, at much too low a figure, the consumption by the railways; and secondly, because it does not take into account the timber used in mines for propping up the galleries; in the building and repair of canal and river boats; in the hop-grounds; in wheelwrights' work; and in the manufacture of furniture, &c., &c. Mons. Burat, Professor of Commercial Statistics, of the Institution of Arts and Sciences, does not hesitate to estimate the annual consumption of timber in France, in building and manufactures, at 10,000,000 cubic mètres, or 353,166,000 cubic feet, to which must be added 30,000,000 cubic mètres, or 1,059,498,000 cubic feet for firewood, and 15,000,000 cubic mètres, or 529,749,000 cubic feet made into charcoal.

Now the produce of the timber sales, under the management of the Inspector of Forests, varies between 70 and 80 million of francs, or £2,800,000 and £3,200,000 each year. Allowing, therefore, that the private forests, the area of which is equivalent to the whole of the government forests,* produce the same sum, the maximum amount arrived at is only 160,000,000 francs, or £6,400,000.

This amount, in fixing the average price of the cubic metre (or $\frac{3}{10}$ cubic foot) of timber for building and other purposes at 30 francs (24s.) only, will be more than absorbed by this calculation. The forests, therefore, will be absolutely inadequate to meet the enormous consumption above-mentioned, if the clearings (which on an immense scale are continually taking place) and the scattered timber which marks the division of properties are not taken into account.

Unfortunately the landholders are foolishly advised, and object to having timber round their fields; neither will they replace the trees they cut down, while the gradual diminution of individual wealth is constantly urging on the conversion of the forests into cultivated land. The consequence is, that in proportion as the consumption increases, the supply diminishes; the value is thereby augmented, and the wish to realise quickly adds to the impoverishment, of which the disastrous effects are already felt in many parts of France. It is therefore of great importance to discover a method of prolonging the durability of timber for building purposes, and, by diminishing the consumption, to arrest this scarcity.

The author states his opinion that the rapid decay of modern-built ships is traceable to this cause alone—that we cannot leave them sufficiently long on the stocks to be seasoned. Such also will be the fate of the magnificent cuirassed frigates, if some efficacious remedy be not speedily applied. The risk is even so much the more to be dreaded for the new ships, as the casing of the upper part of the broadside with the iron plates must have the effect of increasing considerably the inertia of the sides; and the variations of her draught during stormy weather will be much greater, when, by reason of the decay of the ribs, the bolting which fastens the planks to the timbers will no longer have sufficient hold.

The following points may be considered separately :—

1st.—The selection and employment of timber, with regard to its natural qualities.

2ndly.—The preservation of store or yard timber, and its preliminary artificial seasoning for building purposes.

3rdly.—The precautions to be taken in ship or other building, and the preparations to be applied to timber, either to neutralize the agents of decay, or to render it impervious to them.

I.—The Selection and Employment of Timber.

After some remarks upon the oak grown in France, and the mode of selecting the best qualities, the author goes on to say :—

With regard to foreign timber, that grown in Italy and on the shores of the Adriatic is the best that can be used for the ribs of ships, and should be carefully sought for. For planking, ceiling, and longitudinal joining, Indian teak (as famous for its durability as for its specific lightness and toughness) should be selected. An opportunity will also soon occur of largely extending the working of the immense timber forests in Guyana, of which certain species of timber, from some experiments made by the author, give promise of qualities altogether unexceptionable—such as elasticity, strength, and durability.

In Guyana the forest trees do not grow in clusters, like the oak and beech in France; on the contrary, several species, without order or any relative analogy, are mingled together, so that, for any good to be done, it would be absolutely necessary to select a certain number of species. Fortunately those which are met with in the greatest abundance, are also those which offer the greatest resources for ship-building—such as the Angélique, the Coupi, the Violet-tree, and the Wacapoa.

From the specimens procured by the author, he cut a certain number of lengths of wood about 20 millimètres (or three-quarters of an inch) thick, which, by the machine used at Cherbourg for experiments of this kind, have been tested with other lengths cut from planks of forest oak taken from the stores of the same port, and with another length of Moulmien teak bought in England to line the broadside of the *Normandie* frigate under her iron plates. He added to these some lengths from a sample of Indian teak of superior quality; also lengths of beech and poplar, which had been injected with sulphate of copper.

Below is a table of the average results of the first series of experiments, in which three lengths of each species were subjected to the machine or steel-yard; all had been cut for some time, and appeared equally seasoned; the space between the points of support was 20 centimètres, or about eight inches. An apparatus made for the purpose enabled him to calculate the elasticity almost to the tenth of a millimètre.

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* The area of the forests in France, at the period of the conquest of the Gauls by Julius Cæsar, is estimated at 40,000,000 hectares, or—

	Hectares.		Acres.
Royal Forests	1,100,000	or	2,720,960
Forests belonging to the Communes and Public Institutions.........	1,900,000		4,699,840
Private Forests	3,500,000		8,657,600

so that the State, which ought to be the sole proprietor, is now the owner of the smallest portion of forest land.

TABLE.

		Weight of the Cube Mètre (35½ cubic feet).	Amount of Pressure.		Elasticity.			Appearance of Fracture.	Co-efficients	
			At yeilding point.	At point of fracture.	Under a pressure of 220·10.	Extent of Elasticity.	At commencement of Fracture.		of Elasticity.	of Fracture.
		lbs.	lbs.	lbs.	Feet.	Feet.	Feet.			lbs.
	Forest Oak (French)	1644	276	331	0,7874	0,13778	0,21249	short.	62,500	124
	Moulmein Teak (superior)..	1435	441	634	0,03937	0,10236	0,14566	in splinters	125,000	238
	Moulmein ,, (soft)	1302	386	441	0,07086	0,14960	0,17715	short.	69,500	168
Guyana Timber.	Angélique	1700	508	607	0,03543	0,11417	0,13778	splinter.	140,000	225
	Coupi	2207	500	551	0,04724	0,14173	0,19291	,,	104,000	207
	Violet-wood	1865	717	883	0,03543	0,13779	0,27559	,,	140,000	331
	Wacapoa..................	1858	607	662	0,03937	0,15768	0,19685	,,	125,000	248
	Balata	2362	828	1048	0,02362	0,13779	0,27559	,,	207,500	370
	Courbaril...	2075	772	938	0,01967	0,14960	0,23632	,,	250,000	351
	Taoub (yellow)	1910	551	662	0,03543	0,14172	0,35433	,,	140,000	248
	Saint Martin	2053	717	772	0,03543	0,14172	0,17322	,,	140,000	289
	Black Cedar	1766	607	662	0,04330	0,13385	0,18716	,,	114,000	289
	Beech (injected with sulphate of copper)	1744	331	386	0,05511	0,14172	0,28346	short.	89,000	136,10
	Poplar (injected with sulphate of copper)	86010	22010	276	0,12204	0,12204	0,26622	splinters.	41,500	103,3

From the preceding table it is evident that if we represent by an unit either the comparative elasticity of the oak, or its power of resistance to fracture, we shall have the following series of proportionate numbers corresponding to the other species:—

DESCRIPTION OF TIMBER.		PROPORTIONATE NUMBERS.	
Forest Oak..		1,000	1,000
Teak (superior)		2,000	1,920
Teak (soft)..		1,100	1,330
Guyana Timber	Angélique...	2,250	1,830
	Coupi	1,760	1,660
	Violet-wood	2,250	2,650
	Wacopoa	2,000	2,000
	Balata..	3,325	3,150
	Courbaril	4,000	2,825
	Taoub (yellow)	2,000	2,000
	Saint Martin	2,000	2,325
	Black Cedar	1,820	2,325
Beech (injected with sulphate of copper).		1,420	1,100
Poplar „ „ „		0,665	0,830

Without wishing to attach any specific importance to these experiments, which require to be repeated and varied, the relative inferiority of the soft oak of French forests, as regards elasticity and power of resistance to fracture, cannot but be remarked. It will also be observed how unsatisfactory was the teak brought from England for the lining of the iron-plated frigate. It appears that the forests of Moulmein are exhausted, and in that locality we can only find timber of a mediocre quality. The author's opinion is, that we must now go to the shores of the Bangkock, in the kingdom of Siam, where immense forests, yet unexplored, are to be found. The high numbers to which the several species of Guyana timber refer are well worthy of attention, as well as the identity which appears to exist between the Angélique and the Moulmein teak of superior quality, which justifies the distinctive appellation sometimes given to the Angélique as "the Guyana teak."

But whatever may be the importance attributed to the qualities of elasticity and strength, there is one which, in ship-building, ought to take precedence of all the others, and that is durability. It is true that in general (and experience has shown that this rule applies strictly to the oak) the strongest and most tenacious timber is at the same time the most durable; but when there is a question of the other species, the rule does not always prove correct, so that to form a true and just opinion of the quality of timber, it is necessary, by direct experiments, to estimate its relative durability. The author gives the details of those made by himself. Taking a new set of lengths chosen from the same specimens of timber, he put part of them in a box with alternate layers of moist horse dung, and the box was then hermetically closed. The other lengths were driven into damp earth, a little more than half their depth. After remaining six months in these positions, the several lengths were withdrawn and subjected to the steelyard. Some of them had lost more in the dung, and with the others the contrary was the result. The average of the two losses is recorded in the following table (see next column).

It is impossible not to be struck with the astonishing superiority in every point of view of the several species of timber from Guyana.

The Angélique especially appears destined to render the greatest service to ship-building, for in addition to its qualities of elasticity, strength, and durability, its density does not exceed that of the common oak. On the contrary, the other species are a little heavy, without however being excessive in that respect. Their place will be at the bottom of the ship, while the Angélique will be advantageously substituted for teak on the broadside under the iron plates.

TABLE OF COMBINED LOSS OF STRENGTH OF DIFFERENT SPECIES OF TIMBER, AFTER REMAINING SIX MONTHS IN THE EARTH OR DUNG.

DESCRIPTION OF TIMBER.		Loss per Cent.
Forest Oak..		30
Teak (superior)		15½
Teak (soft)..		25
Guyana Timber	Angélique	5
	Coupi	0
	Violet-wood	0
	Wacapoa	0
	Balata..	10
	Courbaril	12½
	Taoub (yellow)... ...	31¾
	Saint Martin	14¾
	Black Cedar	22½
Beech (injected with sulphate of copper)...		30
Poplar „ „ „ ...		10

II.—PRESERVATION OF STORE OR YARD TIMBER AND ITS PRELIMINARY ARTIFICIAL SEASONING FOR WORKING PURPOSES.

It is well known that the trunks of trees grow by the superposition of annual concentric layers, and consequently are composed of wood of very different ages. For example, an oak of 150 years encloses in its centre and at its foot wood of the same age, and at the surface and top wood of a year old. Arrived at a certain age—but varying exceedingly in quality according to climate, exposure, and soil—vegetation ceases, and the oldest layers begin to ferment and decompose. We become aware of this when we see the topmost branches of the tree prematurely lose their leaves, or when they remain without foliage in the spring. Then we say the tree is withering, or on the decline. That is an immediate blemish, and the branches which are touched with it are liable to perish in the centre, even before they are brought into use. When, however, this defect is not very apparent, it will not be necessary to exaggerate the danger; and those even slightly acquainted with the laws of the resistance of solids very well know that the central portion of a piece of timber bears a very little part in the resistance of the log, as regards either fracture or tension. But it is not prudent to allow trees to attain that limit beyond which the vital principle begins to decay.

Timber, sound at the heart and exempt from all accidental and local defects, only decays under the influence of certain causes, which it is important carefully to define, in order that we may be enabled to combat them successfully. When a tree is felled it encloses in its fibres as well as in its capillary channels a considerable quantity of sap, which is nothing else but water charged with gummy, saccharine, saline, mucilaginous, and albuminous matters. In this state the latter are very liable to ferment, but they lose this liability when, by the evaporation of the sap, they pass to a dry and solid state; so that the first suggestion which naturally presents itself to the mind, is to subject the timber to a lengthened seasoning.

Unfortunately timber in general, and particularly that of the oak species, requires a very long time before the mass is thoroughly seasoned. This arises partly because (the wood being inaccessible to heat) the sap, excepting that immediately below the surface, does not exude in vapour—the only form in which it could escape quickly—and partly from the incrustation and the narrowness of the channels, which present a more or less powerful obstacle to the evaporation of these exhalations.

A natural seasoning would be sufficient for specimens of moderate thickness, such as boards for inlaying and panelling, &c., &c., or even for some thicker woods, from which in working up they take off only a thin shaving from the surface—for example, the planking of ships; but it would be entirely useless as regards rough square logs intended to be used as ribs, and from which from 40 to 50 per cent. of the original mass is taken off. Then, however seasoned the exterior may appear, a considerable degree of dampness is found under the fibrous tissue of the wood. Exposure of the timber to free air for some length of time can alone remedy this evil; and, as I before stated, such was the course pursued with all ships formerly built, when left to season on the stocks for 10, 15, and even 20 years.

Now that circumstances oblige us to forego this excellent plan, it is imperative to replace it by artificial and speedy methods. They consist—

1st.—In depriving the timber of the greatest possible quantity of sap, and consequently of the fermenting principles therein contained.

2ndly.—In subjecting felled and sawn timber, before putting together, to an artificial seasoning.

3rdly.—In charring or scorching the surface of the wood by means of a slight carbonisation when the work is finished.

It is a well known fact that the longer wood has remained under water, the more rapidly it dries; for instance, in Paris, everyone is aware that the firewood brought out of the river is less green and burns better than that brought by waggon or boat, In reflecting on the cause of a phenomenon apparently so paradoxical, this conviction is forced upon us, that it is of the same nature (or from the same cause) as that which causes the "Endosmose" and "Exosmose" discovered and described by the celebrated naturalist, Dutrochet.

When timber is submerged, the sap, by reason of the matters which it holds in solution, is denser than the pure water; moreover, it is enclosed in fibres or channels permeable at the side. The phenomenon of Endosmose ought therefore to be gradually produced, and to extend itself, as by a kind of cementation; so that, in supposing the surrounding water to be flowing, or at least changing, this water will conclude by occupying, if not altogether, at least in a great degree, the place of the sap, which will have issued forth, carrying with it the fermenting principles with which it is charged. The timber, therefore, which has remained sufficiently long in the water ought to be much less susceptible of fermentation than that seasoned only by the atmosphere. Besides, as pure water evaporates much easier than that which contains certain principles, this timber ought to be seasoned much sooner than the other—a fact confirmed by long experience.

If the preceding explanations are well founded, we should conclude from them that the Endosmose will develope itself with so much greater rapidity, as there shall be a greater difference of density between the surrounding fluid and the sap. On the contrary, the denser the liquid in which the timber is immersed, so much longer will the Endosmose be retarded, and, if there is any difference between the specific gravities of the sap and the water, Endosmose will not be produced.

This remark is most important, as it proves that timber cannot be seasoned in salt water, but in fresh, or at the most, in brackish water. As to the sea, it can only be regarded as an economical storeyard. The submersion of building timber becomes now so much the more necessary, as floating is very seldom resorted to, the greater part of the timber being brought to the ports by railway. *

With regard to the question, "How long it will be necessary to allow the timber to remain in water in order that it may get rid as much as possible of its sap?" the author recommends:—One year in river water, two years in fresh water (frequently changed), and three years in brackish water (which should be always changing). At the close of these several periods, the boards intended for planking should be taken out to be put in store; or they might be left to season themselves naturally for two years, at least, before being worked up. As to the rough timber for ribs, seasoning in store would be, as already stated, totally insufficient; and it would be requisite after shaping, but before putting together, to subject it to an artificial seasoning. There have been many plans of this description in use for some time in France and England, but they have only been applied to wood of moderate thickness, such as boards, flooring, and wainscoting.

The plan adopted in London is the injection, by means of a ventilator, of hot air into the drying stove where the wood is placed; by this the temperature is gently and gradually raised until it reaches boiling heat. But, as wood is one of the worst conductors known of caloric, if this plan is applied to large logs, the interior fibres still retain their original bulk, while those near the surface have a tendency to shrink, the consequence of which would be cracks and splits of more or less depth. If, however, this defect is not too apparent, it would have little influence on timber used as ribs, but would render it unfit for planking.

Another method in operation at this present time at Tourlaville near Cherbourg, for which the inventor, M. Guibert, has taken out a patent, appears, in the author's opinion, to give at once more expeditious and sure results than those obtained from the use of dry and hot air. It consists in filling the drying stove with smoke produced by the distillation of certain combustible matters, such as saw-dust, waste tan, and smith's coal, &c. By means of a ventilator, ingeniously arranged, a rotatory movement round the logs laid to season is given to the smoke, so as to obtain an average uniform temperature in every part. By this plan, as the distillation of combustibles is always attended with a considerable discharge of steam, all cracks and splits appear to be prevented.

The apparatus invented for the same purpose by Messrs. Lège and Fleury Pironnet, for the injection of sulphate of copper into beech and poplar, may likewise be used. This apparatus is composed of a cylinder 15 or 16 mètres (or from 49 to 52 feet) in length, with an opening of about two mètres (or 6½ feet), into which, after the wood is placed and the opening hermetically sealed, a jet of steam is introduced, intended at first to enter the timber and open its pores for the purpose of obtaining a sudden vacuum, so as to establish at any time a communication between the interior of the cylinder and the cold water condenser, like Watt's condenser, at the same time that the air-pump is put in action. The vacuum caused is very powerful, equal to an altitude of 65 centimètres, or 25½ ins. of the barometer. Under the double influence of the heat and the vacuum, the sap is quickly evaporated from the wood as steam, and ejected from the cylinder by the air-pump, so that in a very short time the wood is fully prepared to admit the preserving liquid through the entire bulk. If the wood is only required to be seasoned, a current of warm air is substituted for the liquid, and to this a certain proportion of sulphuric acid should, in the author's opinion, be added. Without doubt, this method of seasoning would be the quickest, and we should thereby avoid the cracks and splinters which are nearly always produced when dry and hot air only is applied.

The principal drawbacks to the use of the apparatus are its complicated details and heavy cost, but the result to be obtained is most important.

III.—PRECAUTIONS NECESSARY TO BE TAKEN IN ERECTING THE APPARATUS, EITHER TO NEUTRALISE THE AGENTS OF DECAY, OR TO RENDER THE TIMBER IMPERVIOUS TO THEIR INFLUENCE.

A species of embalming was one of the oldest methods adopted, We are aware that from time immemorial

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[*] In particular, preliminary immersion is indispensable for Guyana timber; which, as the produce of a country warm and damp in the extreme—and where vegetation never stops, we may really say never—contains a prodigious quantity of sap. To the neglect of this precaution we must, without doubt, attribute the unfortunate results appearing in some timber brought from that country and worked up in the French dockyards thirty years ago.

either aromatics or poisons have been successfully employed in the preservation, for an almost indefinite period, of defunct organic bodies; and as animal substances and grasses, which otherwise decomposed with the greatest rapidity, are those whose tissues most readily admit preserving liquids, it is of course with them that the plans of preservation will best succeed. The effect of the poisonous solutions employed appears to be an insoluble combination of those solutions with the albumen of organic matters, by arresting their fermentation, which always precedes cryptogamic or fungoid vegetation, or the deposit of the eggs of xylophagous insects.

Dr. Boucherie's plans for preserving timber have some connection with this method; and although he has not succeeded in their adaptation to the most valuable building timber, he will not the less have rendered an immense service to France, by substituting in lieu of oak (the scarcity of which is continually increasing) other kinds of timber suitable for many purposes, and especially for railways. In fact, experience has shown that timber is permeable, at least by aqueous solutions, only so long as the sap channels are free from incrustation. Such in general, is the case with beech, elm, poplar, hornbeam, and the service tree, the capillary tubes of which are always open, or at least close very slowly. At the same it may be said that there must remain even in these species some parts impervious to injection, while it is almost impossible but that a certain portion of the fibres will be more or less incrusted.

The sap woods, on the other hand, of every species, appear quite pervious; and on this quality is based the preparation of telegraphic poles, which, as every one knows, are made of young fir trees stripped of their bark, the inside of the fir, like that of most of the common resinous trees, being impermeable. But in all these cases these preparations are only to be applied to wood in the store or yard, or to that prepared but not put together.

The principal cause of the fermentation—always the forerunner of decay in timber—is the presence of an atmosphere of warm, damp, and stagnant air. On one of these three conditions being removed, the durability of timber would be immediately prolonged. Thus it is that we cannot contemplate without a feeling of admiration the woodwork of the oldest mansions or churches. The joists of the houses built by our ancestors last almost for ever, because they are in contact with air which is continually changing. Now, on the contrary, we foolishly enclose them between a ceiling of plaster (always very damp to begin with) and a floor; they rapidly decay, and sometimes cause the most serious disasters, of which it is impossible to be forewarned. The timbers of our ships, placed as they are between the outside planking and the inside ceiling, are in the same predicament; the stagnant air of the channels is heated by the vicinity of the hold, and at the same time is charged with moisture, as much from the constant emission of aqueous vapour from the wood, as from the leakage of water through the seams, which, during rough weather, always open a little. Thus it is the timbers decay with frightful rapidity, endangering either the ship or the health of her crew.

The bolting ought to be considered as the only safeguard of a ship; for the planking, which enables her to float, only discharges that duty in proportion as it is solidly fastened to the ribs. But the grip of a bolt being proportionate to the friction that it experiences in the channel where it is driven, and that friction proportionable to the spring developed in the wood when the bolt is driven in, if the sides of the channel are altered, the adherence of the bolt is considerably lessened, the planks play one upon the other, eject the caulking, and allow water to penetrate through the seams. Under these circumstances the ship is no longer seaworthy, and must seek the nearest port to be repaired.

The signs of decay in timber are fungi. Some of them, now and then, are microscopic, and owe their existence to the sporules deposited on the surface; while fermentation, generated by prolonged contact with warm, damp, and stagnant air, is as a soil where seeds sow and nourish themselves. When a ship is under repair we are often astonished at the appearance of fungi. enormous in length or bulk, which are visible on all the surfaces of the circumference of the ribs in contact with the planks; and we may observe that the depth of the decay, from the outside to the inside, is in proportion to the size of the fungi. In general, however, they are not so abundant in the channels, or on the surface lengthways. This tends to show that the air in the fibrous tissue of the wood is not absolutely stagnant, the differences of the temperature of the several layers causing a slight current of rising and falling air. It is not the same even with the thin draughts of air enclosed on the surface in contact with the planking and the timbers; the friction that these draughts experience is sufficient to render their stagnation complete, it being a well known fact that timber decays principally when in contact.

The causes and the development of decay in timber having been stated, the nature of the remedies, preventive or repressive, maybe enumerated in the following order:—

1st. By disturbing the stagnation of air in the channels or space and room of the timbers.

2ndly. By getting rid of the confined air in contact with the timber.

3rdly. By preparing the surface of timber in such a manner as to prevent the engendering and growth of fungi.

4thly.—By impregnating the air in contact with the timber with a substance destructive to the sporules of the fungi.

It is a common error in building the hull of a ship to isolate the channels, and cut off their communication with the outer air—a bad practice, which must be abandoned. Formerly they were sparing of bull's eyes in the lower decks, but though the want of light added to the dirt of the hold, the advantage of them in caulking the seams was found too great to allow their use to be altogether discarded.

A very simple plan, and one without any inconvenience, to bring all the air channels into communication, would be, at equal distances on the surface of the length of the ribs, to bore holes about three centimètres (1⅛ inch) in diameter, which would not materially weaken the main timbers, equally taking care to arrange the half circular channeling on the lateral surface of the bends which keep apart the ribs. By these precautions, the air confined in the channels would be continually renewed; moreover, a quicker circulation in that air might be produced at any time by means of a small ventilator, similar to that used in mines, the handle of which would fit into one of the holes, all the others on the same side, one excepted, being shut. By these simple means the air channels would be rendered wholesome, and the fermentation on the surfaces of the length of the ribs be prevented; but they would not be sufficient to freshen the little draughts of air confined between the planking and the ceiling, which are retained by friction, so that it would be necessary to use some other means to get rid of them. They now exist only because, timber having but little compressibility, the surfaces in contact cannot mould themselves, which it is indispensable they should do, exactly one upon the other; but this can be accomplished by interposing an elastic substance, such as india rubber, either compressible like felt, or a cement like that of glaziers, but made with oil without driers, and mixed with a certain proportion of flour of sulphur. This last method the author thinks particularly worthy of trial.

But the most important plan is to prepare the surface of timber in such a way as to prevent fermentation, and to render the adherence and growth of fungi almost impossible. From time immemorial it has been the practice, particularly in the country, to burn the ends of poles driven into the ground, to preserve them from decay. According to the sage remark of the celebrated Carlomb, we should always take into serious consideration old and well known customs; but, in this instance, it is easy to admit the preserving effect of carbonization. In the first place, the surface of the timber is subjected to a considerable heat, the primary effect of which is to exhaust the sap of the epidermis, and to dry up the fermenting principles—here this is done by long exposure to the air; and in the second place, below the outside layer, completely carbonized, a scorched surface is found, that is to say, partly distilled and impregnated with the products of that distillation, which are creosoted and empyreumatic, the antiseptic properties of which are well known.

The author mentions instances of carbonized wood having been remarkably preserved for long periods under unfavorable circumstances, and observes that he was convinced by all these facts that the carbonisation of the timbers of ships would materially increase their durability; but that conviction was changed to certainty when he met with an article entitled "Seasoning of Timber," extracted from "The Architectural Navy," a work published in London in 1852. The writer, having noticed the numerous methods tried in the beginning of the 18th century to increase the durability of timber for building purposes, adds, that "not long after this time the method of heating or charring timber, before it was worked up, and also that of stoving, that is, of heating it in kilns with sand, was practised in the royal dockyards. The *Royal William*, one of the most remarkable instances of durability that the British navy has supplied, was built either wholly or in part of timber that had been charred."

The author asks why has this excellent method not only not been persevered in, but even abandoned? This is owing to many causes; the difficulty and danger of the means adopted for charring, when either straw, fern, or shavings are made use of; the serious objections of burning the timber too deeply; or the incumbrance of the apparatus, and the length of the time occupied, if sand kilns sufficiently heated are used; and, finally, to indifference, or that system of routine against which the wisest plans so often contend in vain.

The methods of carbonisation which the author first employed at Cherbourg, and which, by the order of the Minister of Marine, are about to be extended to all the dockyards of the French empire, are free from these objections, and realise, on the contrary, all the conditions to be desired, whether of simplicity, facility, safety, or economy. They are as follows:—

A gaspipe is brought into the dockyard. An india-rubber tube is screwed on, the other end of which, furnished with a joint, should be fixed at the side of the bench at which the men work. To this joint another end of a tube of sufficient length is fixed, and on that a little brass end is placed, similar to that of a fire-pump, but having inside a small pipe communicating with the reservoir of a foot bellows on the bench. The object of this bellows is, first, to mix with the gas the air necessary to obtain a complete combustion; and, in the second place, to impinge on the jet of flame such a force that it may be directed every way, and made to act not only on the surface of the wood, but in the holes, joints, bolts, mortices, &c., and in general on every part of the timber. The combustion takes place with the most perfect regularity, and, as can be proved, without the least danger, which, be it understood, does not exclude the precautions commonly prudent to adopt whenever fire is employed either on shipboard or in the dockyard.

The results obtained from experiments at the gasometer at Cherbourg, with the aid of a meter, and using a jet of average force, are—

1st.—That the consumption of gas would be about 200 litres per square mètre, or 200 gallons per 10 square feet of carbonized surface.

2dly.—That a workman, in an average day's work of 10 hours, would carbonize a surface of 40 square mètres, or 440 square feet.

3dly.—That one workman is sufficient for a bellows supplying two jets of gas.

It may therefore be admitted that, at full work, the expense would not exceed 15 centimes (1½d.) a square mètre, or 10 square feet. Besides, as has been ascertained by experiment, the operation can be facilitated by smearing, in the first instance, the surface of the timber with a little tar. By so doing these other advantages are gained—

1st.—The carbonization of the cracks, that almost always occur on the surface of rough timber, is facilitated.

2dly.—It prevents the timber being affected too suddenly by the heat of the gas, which causes it to split.

3dly.—It prevents the cracking and splintering off of little ignited particles.

But beyond a mere facing of tar we must not go; a little thicker layer would impede, instead of furthering, the operation. Besides, we must stop as soon as the surface is freely carbonized, which shows that none of the parts below have escaped the charring—which is, I repeat, the end we seek. Under these circumstances, the depth carbonized will not exceed a third, or a fourth, of a millimètre. In ship-building, the carbonizing process ought to be applied to every surface in contact with, or, in general, intended to be surrounded by, moist and stagnant air.*

Moreover, it will be advantageously employed in the graving docks and slips, from the facility afforded in drying and hardening those parts of the hull intended to be preserved, and in destroying the fermentation which will be found there.

In house building, the process should be applied to the beams and joists embedded in the walls, or surrounded with plaster; to the joists of stables, cowhouses, wash-houses, &c.—which, although exposed to the free air, are constantly surrounded by a warm and moist atmosphere, an active cause of fermentation—to the wainscoting of ground floors; to the flooring beneath the parquet work, to the joints of tongues and rabbets, &c.; for carbonization by means of gas still leaves to the wood, for working purposes, all the sharpness of its edges.

By carbonization a practical and economical means is offered to railway companies of preserving, almost for ever, the sleepers, particularly oak, which cannot be impregnated by the injection of sulphate of copper. Let us suppose, for instance, that after, say 10 or 15 years, the sleepers on a line are taken up for the length of a mile, and replaced by new ones, the old when rasped and burnt again, will serve for the replacing of the following mile, and so on, one mile after the other.

With regard to vine-props and hop-poles, carbonization offers very great advantages in an economic point of view, by its cheap and practical method of operation.

As to the different methods of carbonization; when the timber-yard where the work is to be carried on is in the neighbourhood of a gas main, nothing can be easier than to lead it close to the work by a conducting tube, joining a little gasometer by which the issue is regulated.

If the expense of laying down the pipe is very heavy, compressed portable gas, like that distributed daily in Paris, as in many adjoining localities, can be used. The Imperial Marine adopt that plan, not only because their workshops are not lighted with gas, but, even if they had it, they prefer being able to carbonize certain parts of a vessel when afloat, for which it is sufficient to place on a boat or floating stage, moored alongside, a vessel charged with compressed gas; a regulator is put in communication with this, which allows the issue according to the pressure of the current of gas, or, in general, to such pressure as may be required.

In the place of coal gas, the cost of which is very great, carbonic oxide gas may be advantageously employed; for, while on the one hand, its illuminating power is very weak, its heating power, on the other is very great.

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* Thus, as regards cased or cuirassed frigates, the external, as well as the internal surfaces of the planking, on which the iron plates are fixed, should be carbonized.

Knowing the preservative effects of sulphur, the author was induced to try a species of paint, using flour of sulphur as a basis and linseed oil as an amalgamator.*

We know that when paint dries, to use a common expression, it is not by evaporation similar to that which water undergoes, but rather from the effect of a real combustion of the oil by the oxygen of the air, the result of which is a kind of solid resin, and it appeared to the author probable that the sulphur, having itself a great affinity for oxygen, would participate in that combustion from which would be generated sulphuric acid. These anticipations were fully realised. The planks painted for experiment emitted sulphurous vapours, and turned to red some strips of litmus paper previously moistened and subjected to the exhalations. Some logs of oak, painted in the same way, were buried in a dung-heap; six months afterwards the wood appeared perfectly intact, and exhaled a strong sulphurous odour, the action of which had, without doubt, prevented the formation of fungi.

It therefore appears proved that by smearing here and there either the surfaces of the length of the ribs or below the ceiling with this paint, a slightly sulphurous atmosphere will be developed in the hold, which will purify the air by destroying, at least in part, the sporules of the fungi.

This conclusion will be so much the more valuable, as it appears to be arrived at from the recent and curious experiments of M. Pastoreau, which, by depriving of air the sporules he had enclosed, annihilated their fermenting powers.

With regard to the carbonisation of timber, it may be stated that after having scraped the carbonised or charred layer, and pumiced the surface of the wood, in may be painted in the usual way, and with any colour.

ACCOMMODATION AND EXPENDITURE IN MECHANICS' AND SIMILAR INSTITUTIONS.

The following paper, by Mr. John Jones, Secretary to the South Staffordshire Educational Association, was prepared for the Educational Conference held at Dudley, on the 9th September last:—

Without proper accommodation for the various departments of an Institute, it is not likely to be very extensively patronized by the public; and if the income of a society is not expended with due regard to the interests of each department, the beneficial action of the Institute will greatly suffer. I propose in this paper to offer some remarks on both these heads.

Very few Institutions have exactly the kind of accommodation which is suited to their wants; some have too extensive premises, others are cramped in their operations by reason of inadequate room. Of course the accommodation at any particular Institute ought to be in proportion to the extent of its operations, and this is a matter which local circumstances must always more or less determine. It appears, however, quite possible that certain general principles may be laid down, whereby the managers of Institutions, large or small, may decide on the main features to be included in their work, and may also be able to estimate the cost and necessary premises for carrying on their work.

I consider that Institutions may be divided into two classes:—Those for villages and a rural, scattered population, and those for towns.

In the first case we have a population with little leisure, dotted over a large area, and possessing no good means of getting from one part of the parish to another. For such places it seems desirable that a reading-room should be opened in the evenings, at some central spot, where the thickest population happens to be, but it might combine the ordinary features of a working men's club-room, where the members might read, converse, play at suitable games, or obtain refreshments. Any classes which could be carried on would be of an elementary character, and the proper place for them would be in the village school-room. Here also the lectures might be held, or, better still, regular lecture entertainments, consisting of *short* lectures combined with readings and music. It would be advisable to circulate the library in sections, each knot of houses willing to pay a few pence per quarter having one section at a time. A responsible person being appointed for changing the books at each house (say five or six), he would receive quarterly his section, and would leave two or three with each subscribing family, and, according to the number of houses, he would arrange the time for changing the volumes. A portion of the library might be kept at the reading-room for reference or for the use of the members frequenting the room. Such an Institute needs no more accommodation than a single room in some central cottage, with a tidy housekeeper, who would make the visitors comfortable and provide refreshments in a cosy way. In the majority of villages these arrangements would be found sufficient for all ordinary purposes. If the Institute (for which the name of a village club seems appropriate) could also undertake the management of a benefit society, horticultural show, garden allotments, &c., its operations would be more useful, and would be likely to have more general support.

In the second class of Institutions the conditions are more varied, and hence there is more difficulty in deducing some type which shall be generally applicable. My type of a town Institute consists of one or two reading-rooms, a library-room, a room for refreshment and conversation, one or more class-rooms, &c., and a large room (hall it may be called) for lectures, tea parties, and general purposes. In estimating the accommodation which any place may require, perhaps one-thirtieth of the population may be set down as available members for an Institute. Practically, the average is generally much lower: but there are towns where a much larger proportion than this belong to one or more Institutions, and there seems no reason to doubt that vigorous management will eventually exceed the standard I have named. Taking a town of 3,000 inhabitants as a starting point in the scale of comparison, we have to provide accommodation for 100 to 120 members. First, of the reading-room; one-third of the members will only attend occasionally, about one-sixth will attend during the day only, leaving one half who may be expected as more or less regular evening readers, between the hours of 6 and 10. Probably, then, not more than twelve to fifteen members will ever need to be accommodated in the reading-room at one time, so that 30 feet of available linear space at tables, reading stands, &c., will be ample provision. A small library-room would contain the books, and would also serve as a committee-room, secretary's office, &c. One class-room would be sufficient for this number of members, and would accommodate several classes meeting on different nights. All these rooms should be comfortably fitted up. The club-room for conversation and refreshments should be at least as large as the reading-room, but should be so furnished as to be applicable for various public purposes during the day, as it would only be open in the evenings for members. A lecture-hall, capable of seating 200 people, would be desirable. These arrangements would necessitate a graduated scale of payment. So much for reading-room, club-room or library separately, or a reduced fee for the collective advantages of the various departments, and the rate of payment ought of course to depend on the lowest working expenses of the society. For a town of twice the population, I estimate that the size of the various rooms above named would have to be increasd one

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* The paint is composed of:—

Flour of sulphur	200 grammes,	3,088 grs.
Common linseed oil... ...	135 „	2,084 „
Prepared oil of manganese	30 „	463 „

half. With a population of eight or ten thousand, I am disposed to advocate two reading-rooms, first and second class, with payments accordingly, and it might be necessary to consider the advisability of having two club-rooms also. The class-rooms would have to be more numerous for this population, but a few good rooms would accommodate many classes if judiciously arranged.

As the main work of an Institute is carried on in the evening, the managers often are at considerable loss by their rooms being unoccupied during the day. There seems no reason why day schools of a superior character should not be carried on in Institute rooms, either under the control of the committee or by private enterprise. The managers at all events should endeavour to apply all their rooms to some paying purpose during the day.

For Institutions having a prospect of from one to three hundred members, an hotel or public house is the kind of building which appears the most easily adapted to the purposes of such a society. The rooms will be found conveniently arranged, so that each one shall be quite independent of any other. The tap-room becomes the reading-room; the parlour changes to a conversation and general room; the bar makes a good library and secretary's office, where books are handed out instead of beer; the large bed-room becomes committee-room, and other apartments form class-rooms or offices; the club-room at the back easily falls into a homely lecture-hall, school-room for day and evening pupils, &c., and there is ample accommodation for the person who has charge of the Institute.

Large towns require special buildings. A spacious hotel contains too many small rooms to be useful for Institute purposes; hence it appears advisable in such cases for the promoters of the town Institute to calculate what accommodation they will require, according to some such standard as that before mentioned, and then to erect a building sufficiently large to allow for any increase of population that may be expected; but not too large, or the Institute will be saddled with a heavy yearly expenditure for repairs, &c., which will be sure to detract from the usefulness of some of its departments.

In considering the expenditure of Institutions, I must lay down certain channels in which I would make the income of a society flow. One part must go for rent and attendance, another for newspapers and periodicals, another for classes, a fourth for fuel and gas, a fifth for printing and incidental expenses. I leave out lectures, because they ought to be made to pay their expenses, and any balance from them might be judiciously employed in arranging for some lecture treat from some eminent man or other. The library I also leave out, as an annual tea party, excursion, &c., would supply a fund which, instead of being applied in one sum to library purposes, might be spent in adding monthly the most important new works.

Having considered the working expenses of a society, the rates of subscription for ordinary and honorary members may easily be fixed, and I propose to deal with this income in the following way:—

We will suppose, for the sake of illustration, that the subscription of ordinary members has been fixed at 10s. a year, and that with the aid of honorary members this sum is raised to an average annual income per member of 12s. 6d. I would apportion $\frac{2}{5}$th of this for rent, fuel, gas, and attendance: that is, the net cost of these items, after all sub-lettings of rooms, &c., have been deducted from the gross charges, should not exceed 5s. per member. One-fifth (2s. 6d. per member) I would allow for the reading-room, after deducting for the sale of old papers; the magazines would circulate for a time, and then be bound for the library; hence, if the number of members should fall off, certain papers must be discontinued; if it should increase, the members would have a direct benefit in the addition of other periodicals. One-tenth of the income I would allow for classes, after deducting the fees from expenses. One-fifth should be made to include printing and advertising, and the other tenth would be for the incidental expenses of the society.

I suggest the above as an approximate standard which may be open to correction, and which the discussion on this paper may enable me to make. I offer it rather as pointing to what I consider the proper mode by which the managers of an Institution should lay out their money than as supplying a rule applicable to all circumstances. Were such general features as I have indicated to be adopted, the members of an Institute committee, though possibly many might be new to the kind of work required of them, would nevertheless have constantly before them a standard by which they could measure roughly whether each department of the society was having justice done to it.

No allusion has been made in this paper to many most desirable schemes which we hope, ere long, Institutions will more generally consider a part of their proper work, and which will have to be provided for out of their ordinary income; but I am anxious not to go beyond those operations which my experience suggests may be carried on by societies in this neighbourhood. My opinion is that we want to induce the managers of Institutions generally to set before them a definite work to do, and there will not be wanting those who are quite willing to do it. Some friends of education charge Institutions with frivolity and the lack of the practical element in their operations. By definitely marking out work to be done, by banding together for mutual assistance and experience, and by the managers meeting to confer together on matters connected with the well-being of their societies, we may hope that the beneficial operations of Mechanics' Institutions and kindred societies may be stimulated, till they take that place in the educational machinery of the country which they are calculated, and I hope destined, to occupy.

ARSENIC IN MANUFACTURES.

At an inquest recently held relating to the death of a young girl named Elizabeth Anne Abdela, Dr. Letheby read a report on the subject of arsenic used in the colouring of ladies' dresses, artificial fruits, flowers, &c. The following evidence was taken by Mr. John Humphreys, the coroner, presiding.

Elizabeth Abdela, of 15, Whitecross-place, Shoreditch, stated that she was the wife of James Abdela, who was assistant at a Turkish bath. The deceased girl was her daughter. The girl had some artificial grapes given to her by a little girl at about 9 o'clock on the evening of Sunday, the 28th ult., and was taken ill at about 11·15 p.m. the same night. Previously to her death the girl complained of pains in the abdomen. She died the following day at 1 o'clock. The witness saw her suck one of the grapes soon after they were given to her. It was green, and she sucked the entire of the green stuff off of it.

Elizabeth Hall, of Masham's-place, Whitecross-place, aged 13 years, stated that she was a companion to the deceased girl, and had given her the grapes spoken of by Mrs. Abdela. Witness worked for Mrs. Chappel, haberdasher, who lived at the corner of Clifton-street, and her mistress gave her the grapes, saying they were of no use to her.

Mr. Chandler, surgeon, stated that he was called to see the deceased girl at half-past 7 o'clock on the morning of the 29th ult. He saw her soon afterwards. She was then insensible, comatose, and she died in the course of the morning. Her symptoms were those of poisoning. He made a *post-mortem* examination of the body. The brain, chest, lungs, and heart were healthy. The anterior part of the stomach was perforated, and food had passed through the perforation. It was his opinion that the perforation had taken place within a short time before death; there were patches of inflammation the size of shillings and half-crowns close to the perforation. The other end of the stomach and intestines was healthy, as was also the kidney.

The patches of inflammation of the mucous membrane were due to some foreign irritant. They might have been produced by arsenical poison, though perforation from arsenic very seldom took place. He had been handed some of the grapes said to be in the deceased girl's possession, and he had got them analyzed. Some of them were green, and others blue; the former contained arsenite of copper, a deadly poison, and the latter cobalt, which was not poisonous in small doses. He did not think that one of the green grapes would have been sufficient to cause death.

At this stage of the inquiry the Coroner decided on adjourning, in order that an analysis might be made by Dr. Letheby.

When the Coroner and jury reassembled again,

Dr. Lethby was sworn, and read the following report as his evidence in the case:—"On Friday, October 3, I received from Edward Waller, the coroner's constable, the following things for examination:—1, a bottle containing the stomach of a child and a piece of intestine; 2, a bottle containing the heart of a child and a piece of liver with the gall bladder attached; 3, a bottle containing the gall bladder of a child; 4, a bottle containing a piece of lung and about half an ounce of blood: 5, a box containing green and blue and pinkish artificial grapes. All these were carefully examined with the following results:—1. The stomach was cut open and its contents were gone. The mucous coat was stained in several places of a dark reddish brown colour, as if from irritation. At the larger end of the stomach there was a chronic ulcer about one-third of an inch in diameter, which had pierced entirely through the walls of the stomach. The tissues of the stomach were examined for poison, but none was found. The piece of intestine was about 6in. in length. It was not opened, but its contents was secured by ligatures at each end. It contained about a teaspoonful of thick matter, highly tainted with bile. Search was made for solid particles of glass, &c., and the whole was examined for poison, but, as in the last case, without positive result. The contents of the second bottle were then examined. The heart was cut open and appeared to be free from disease. The gall bladder contained a large quantity of bile; this, with the piece of liver to which it was attached, was examined for poison, and distinct traces of arsenic were discovered. The contents of the third and fourth bottles were also tested. No poison was found. Lastly, the colouring matter of the artificial grapes and leaves was submitted to analysis The blue and pink grapes were free from poison, but the green ones were covered with arsenical green (arsenite of copper). Ten of the grapes yielded three grains of the poisonous pigment; and I hand to the coroner a specimen of the metallic arsenic obtained from a single grape. The artificial leaves are also stained with arsenical green. Each leaf contains about a grain and a half of the poisonous figment; and I hand in a specimen of the metallic arsenic obtained from a single leaf. The quantity of poison in one leaf is perhaps sufficient to kill a child. The result of this examination is that, although no trace of arsenic has been discovered in the tissues of the stomach and intestines, yet from the presence of a distinct trace in the bile and liver, it is evident that arsenic has been taken during life and absorbed into the system. Mr. Chandler, who attended the child, has given me an account of the symptoms, and they correspond exactly with what I have once seen as the narcotic effects of a small dose of arsenic. The giving way of the ulcer in the stomach might have been due to the irritation of the poison during life, or it might have been a *post-mortem* result; but I do not think from the symptoms described to me that it was the actual cause of the child's death. I attribute this rather to the poison. In the month of November, 1840, I was consulted in a case very similar to this, where a child died from the effects of arsenical green on the paper of the cupboard where its toys were kept. Two children were made ill by it, and one of them died. The case was the subject of an inquest. On that occasion I ascertained that the paper contained nearly 13 grains of arsenical green in a piece of six inches square—a quantity sufficient to kill at least two persons. In many other instances I have found a like proportion of poisonous pigment upon such paper; and it is to be regretted that the dangerous use of such a pigment should continue to be practised. At the present time there are many arsenical greens going by the names of Scheele's green, Swedish green, Siskin green, Parrot green, Brunswick green, Neuwied green, Mountain green, Schweinfurt green, Vienna green, Imperial green, Mittis green, &c., and they contain from 58 to 71 per cent. of arsenic, the pigment being in some cases reduced with chalk or plaster of Paris to lower the depth of the colour. These dangerous pigments are put upon paper, toys, artificial flowers, and even ladies' dresses. A wreath of 50 green leaves may contain poison enough to kill ten persons; and a green tarletan dress of 20 yards would contain about 900 grains of white arsenic; and, considering how loosely the poison is attached, it is marvellous that very serious results do not often occur from it. It has been affirmed, by a Berlin physician, who has inquired into this matter, that a lady's dress might give off sixty grains of the poisonous pigment in the course of a single evening—scattering a dust of poison in the air of a ball-room. It is time that some measures should be adopted for the prevention of this practice. I think it right to say that there is a very easy means of discovering whether a green is poisonous or not. A drop of strong solution of ammonia put upon the colour will acquire a deep blue if copper is present, and copper is rarely present without arsenic.

The Coroner thought that the jury and the public ought to feel much obliged to Dr. Letheby for his scientific and interesting report. As corroborating what that report stated as to the poison which might be contained in a single dress, he might mention that a case had come within his own observation in which two sisters were taken ill after making a green dress for a lady, and the lady herself became ill after wearing it one night in a ball-room. Having heard Dr. Letheby's evidence, he apprehended the jury would have no difficulty in finding that the deceased girl had died from the effects of arsenite of copper contained in the colouring matter of the green grapes—one of which they had it in evidence she had sucked. The grape was composed of very thin glass, over which the colouring matter was spread.

The jury found "That the deceased, Elizabeth Anne Abdela, had been poisoned by sucking arsenite of copper from artificial grapes."

Home Correspondence.

COMPETITIVE EXAMINATIONS FOR THE PUBLIC SERVICE.

Sir,—As many members of the Society of Arts may not have read any reports of the discussion on the paper on Competitive Examinations, read at the meeting of the British Association, held at Cambridge, and which you have done me the honour to insert in the Society's *Journal*, I beg leave to state that we had the advantage of the attendance of a number of the members of the University, who have had great experience in conducting such examinations, and that the main proposition of the paper—that the topics of the subject matters for competition should be narrowed, but that the examinations in the topics selected should be made longer and deeper—was unanimously agreed to.

I gathered that the experience of the members of the University who have conducted middle-class examinations tends to the expediency of narrowing their range.

If it had been conformable to practice to put the chief propositions of the paper from the chair, as resolutions, I believe those who were present would concur with me in saying that they would have been carried, and that there was a very gratifying expression of unanimity on the whole question by the examiners present.

I am, &c.,
EDWIN CHADWICK.

P.S.—I may notice one or two mistakes in printing—*paper* examinations, for *pass* examinations; of history being a field of cram and *developing*, instead of *dodging*.

Richmond, Surrey, Oct. 27, 1862.

Proceedings of Institutions.

Barnet Institute.—The thirteenth annual report states that the prosperity of the Barnet Institute continues unabated, and that great success has attended its operations during the year 1861-2; forty-five new members have been elected during the year. The state of the funds is highly satisfactory. Between Nov. 5th, 1861, and April 16th, 1862, twenty-one lectures were delivered, the whole of which were entirely gratuitous. The committee feel most thankful to those gentlemen who kindly afforded their services as lecturers, and they trust that the attention of their audiences, and the interest manifested in the subjects of the lectures, may induce them to repeat their good offices on future occasions. The library continues to be of a much more limited character than is desirable; the committee are, however, happy to state that in consequence of certain donations given specifically for the increase of the library, aided by a small addition from the general fund, they are enabled to devote £20 to the purchase of books. They hope, moreover, that as opportunities may arise, the friends and supporters of the Institute will kindly favour them with donations of books. One object of this Institution, which has not received hitherto the support to which it would appear to be entitled, is the formation of classes for instruction in various departments of knowledge. The committee regret that no classes have been in existence during the past year. They nevertheless earnestly request the attention of their members, particularly the youngest portion of them, to this feature of the Institute. Of the seven candidates who presented themselves before the Local Board in connection with this Institute, for the certificates of the Society of Arts, in April, 1861, five were successful. Four candidates have been examined this year. The great object of the Institute being to provide for its members the means of occupying, in a profitable manner, some portion of their leisure hours, the committee cannot but entertain the hope that, through the instrumentality of its library and reading room, its lectures, classes, and examinations for the certificates of the Society of Arts, it may be rendered, year by year, increasingly useful to the town and neighbourhood. They trust, moreover, that in bringing together, from time to time, persons occupying various positions in the social scale, it may tend to promote amongst them feelings of mutual respect and good will. The following lectures were delivered in the course of the season:—An Opening Address, by the President, C. T. Carter, Esq.; "The Teacher and the Taught," the Right Hon. Lord Teynham; "Recollections of Switzerland" (illustrated with dissolving views), W. J. Haynes, Esq.; "History of Printing," Rev. S. Davis; Charles Dickens's "Cricket on the Hearth," Mr. Baldock; "Some Men of Our Time," E. W. Cox, Esq.; "The Voice of the Early Church," Rev. C. Skrine; "The Highlands and Islands of Scotland," C. A. Hanbury, Esq.; "Westward Ho!" F. E. Baines, Esq.; "Influence of the Mind on the Body," J. C. Thorowgood, M.D.; "Scenes and Incidents of the First French Revolution, 1790," Rev. C. R. Howell; "The Bar, the Pulpit, and the Senate," D. Duthoit, Esq.; "Popular Superstition," Rev. T. W. Sidebotham, B.A.; Readings in Poetry and Prose, Mr. Baldock; Grand Instrumental Concert, by Band of 2nd Royal Edmonton Rifle Militia, under Bandmaster Farren; "Martin Luther," Major Wilbraham Taylor; "The Twilight World," E. W. Cox, Esq.; "The Electric Telegraph," F. E. Baines Esq.; "St. Alban," J. F. Earle, Esq.; "Lithography," Rev. J. D. Bell; Grand Concert, by Mr. Frank Bodda's Party; "Photography," Mr. Samuels; "The United States of America, as they were and as they are," G. E. Cottrell, Esq.; Second Instrumental Concert, by Band of Militia. The financial statement for the year ending April, 1862, shows that the receipts have been £84 9s. 1d., and the expenditure £70 4s. 5d., leaving a balance of £14 4s. 8d.; the total balance in hand, however, including the library fund, amounts to £31 1s. 2d.

Glasgow Institution.—The Fourth Annual Report of the Glasgow Institution begins by giving a statistical table of the number of scholars and students who have attended it since it was founded, June 2, 1858:—

Year.	Total on the Rolls at the commencement of each year, ending May 10.	Total admitted from May 10 of the preceding year to May 10 of the given year.	Total who attended during the year ending May 10.
	Day	Classes.	
1859......	121	96	217
1860......	127	75	202
1861......	122	71	193
1862......	106	133	239
1862 curt.	143	...	...
	Evening	Classes.	
1859......	72	298	370
1860......	144	391	466
1861......	215	598	669
1862......	211	757	968
1862 curt.	238	...	...

Total number who attended within the year ending May 10, 1859, 587; 1860, 737; 1861, 1,006; 1862, 1,207. From the above table it thus appears that 1,207 distinct individuals have received instruction in the Institution during the year ending May 10, and that there were then on the roll 143 in the juvenile day classes, and 238 in the evening. Total for the summer season, 381. The number of tickets sold has been 2,090, exclusive of 317 on the rolls at the commencement of the season. The following are the numbers attending the various classes during the year. Of these about 200 attended more than one class. Mathematics, 35; geography and history, 8; drawing and perspective, 18; mechanical drawing and practical mechanics, 23; Latin. 105; Greek, 23; French, 111; German, 18; grammar, composition, and logic (English history as exercises), 166; writing, arithmetic, and bookkeeping, 161; ladies' classes for arithmetic, grammar and composition, &c., 17; phonography, 58; Gaelic, 7; music, 23; elocution, 121; mutual instruction, 25; juvenile day classes, 239; advanced juvenile, Latin, bookkeeping, drawing, &c., 15; needle-work (day), 21; evening elementary classes for ladies—reading, writing, arithmetic, domestic economy, 73; evening elementary classes for boys and men, 64; morning elementary classes, writing, arithmetic, &c., 21; and dancing and deportment, 50. This year 46 candidates, implying 70 papers on 17 different branches, taught by 10 different masters, gave in their names for Society of Arts Examinations, and 21 for Local Board certificates only, being too young (below 16), or for branches not recognised by the Society of Arts, such as elocution, grammar, composition, &c. Of the former, 39 persons and 56 papers came forward to the Preliminary Examinations of the Local Board, of whom 36, implying 52 papers, were passed. Of the latter, 21 came forward and 16 were passed. Of the Society of Arts' candidates, 29 came up to the Final Examinations, embracing 39 papers; 3 more who came late had to be rejected. Of the Local Board candidates, 13 came forward and 11 passed; 25 candidates and 34 papers were passed, to whom 8 first-class certificates, 16 second, and 16 third were awarded. The Society of Arts' second prize for book-keeping was awarded to James M'Callum Cherry, and the Board's first prize for grammar and composition to Robert M'Ilwraith. The following is an abstract of the pecuniary affairs of the Institution from May 15, 1861, to May 14, 1862:—

Receipts:—

	£	s.	d.
To class fees	£506	17	10
1st prize awarded to Local Board	10	0	0
Total	£516	17	10

Disbursements:—

	£	s.	d.
By rents and taxes	£71	10	10
Coals, gas, cleaning	23	0	9
Advertising, printing, stationary	52	6	10
Subscription to the Society of Arts, and expense of Examination	6	8	4
Salaries to teachers	363	11	1
Total	£516	17	10

On entering the premises now occupied by the Institution, at Whitsunday, 1861, a considerable sum had to be expended in repairs, a large portion of which is still owing. With the view of extending the membership, and with that, the interest in the Institution, at the stated general meeting of the members in April, the privilege of becoming members was extended to every individual paying five shillings annually, whether he or she be attending, or have scholars attending, the classes or not—formerly no others were admissible. On the 3rd of May last, by appointment of the Local Board—the authorised Inspectors of all the classes—the examination of the juvenile day classes was conducted by a committee, nominated for the purpose. Forty-eight candidates for Local Board certificates presented themselves, who were examined in reading, writing, spelling, grammar, and arithmetic. The result of the examination was, that 16 first-class certificates were awarded, 18 second, and 10 third; total passed, 44, and 1 added afterwards, 45. The pupils presented to Mr. Craig, the head master, a Family Bible, and to Miss Craig, an elegant Church one, accompanying the gifts with expressions of affection and attachment. The public Annual Examination of those classes took place on May 5. The Directors desire to thank those gentlemen who have given donations in aid of the Furnishing Fund, and trust that, if the present debt were once cleared away, they will not again need to appeal in a similar manner. They have also to thank the Local Board for the painstaking manner in which the various and somewhat onerous duties devolving on it have been discharged. Also, to thank the present teachers of the Institution for their indefatigable exertions and efficiency in conducting their respective classes; and, lastly, to congratulate the students and pupils on the success which has attended their earnest and well-directed studies.

MEETINGS FOR THE ENSUING WEEK.

Mon. ...Medical, 8½. Dr. Thudichum, "On the Treatment of Dropsies, in connection with Diseases of the Kidneys, the Liver, and the Blood."
Geologists' Association, 7. Prof. Morris, "On the Plants of the Coal Measures."

Wed. ...Geological, 8. 1. Prof. L. de Koninck, "On some Fossils from India," collected by Dr. J. Fleming. Communicated by Mr. T. Davidson. 2. Miss E. Hodgson, "On a Deposit containing Diatomaceæ, Leaves, &c., in the Iron Mines, near Ulverstone." Communicated by the President. 3. Capt. F. Applegath, "On the Geology of a part of the Masulipatam District." Communicated by the President. 4. Mr. J. G. Sawkins, "On some Granitic Rocks in Jamaica."

Thurs...Linnean, 8. 1. Mr. Albany Hancock, and the Rev. A. M. Norman, M.A., "On *Splanchnotrophus*, an undescribed Genus of Crustacea, parasitic on Nudibranchiate Mollusca." 2. Mr. A. Adams, Surg. R.N., "On the Species of *Pyramidellina*, found in Japan."
Chemical, 8. Mr. W. Doucer, "On Hypobromous Acid."

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, October* 17*th*, 1862.]

Dated 4th October, 1862.

2683. J. E. Billups, Halswell-terrace, Cardiff—Fixed points for railways.
2685. F. Parkinson, 114, Wood-street—Imp. in ladies' shawls and cloaks.
2686. F. Watkins, Smethwick, Stafford—Imp. in apparatus for milking cows.
2687. F. E. Blatspiel, Warwick-court—Imp. in diving apparatus and apparatus to be used for working in deep water. (A com.)
2690. F. Johnson, Great Charlotte-street, Landport, Portsmouth—Imp. in domestic fire escapes, and in receptacles for the same.
2691. W. Taylor and S. Buckley, Oldham—Imp. in machinery for preparing cotton and other fibrous materials.

Dated 6*th October*, 1862.

2692. R. Page, Great Yarmouth—Imp. in stables and stabling, applicable in part to kennels, and to the floors of fish houses.
2694. J. Bradbury, Pendleton, and W. Bradbury, Oldham, Lancashire—Certain imp. in carding engines.
2695. D. Lowe, Aston, near Birmingham—Imp. in the manufacture of door bolts and latches.
2696. S. Holland, Oldbury, Worcestershire—Imp. in machinery for the manufacture of bricks, drain, sanitary, and other pipes, tiles, quarries, and other articles of like manufacture, made from clay, marl, and other plastic substances.
2697. W. Clark, 53, Chancery-lane—Imp. in articles of clothing. (A com.)
2698. J. Newnam, Crayford, Kent—Imp. in apparatus for crystallizing and for evaporating.
2699. T. Beards, Stowe, Buckinghamshire—Imp. in machinery for cultivating land.
2700. S. F. Cox, Bristol—Imp. in washing and tanning hides and skins.
2701. A. V. Newton, 66, Chancery-lane—An improved apparatus for drying grain. (A com.)
2702. C. Chinnock, Queen's-road-west, Regent's-park—Imp. in the construction of axle boxes.

Dated 7*th October*, 1862.

2703. J. Heap, Ashton-under-Lyne—Imp. in screw stocks and dies.
2704. J. Smith, Egdon, near Worcester—An improved screw linchpin for carriages and agricultural implements.
2705. W. Aston, Birmingham—Certain imp. in the manufacture of buttons for ladies' and gentlemen's wear.
2706. J. Oxley, Frome—Imp. in apparatus for expressing and separating beer from yeast or barm.
2707. F. Rahles, Albert-street, Middlesex—An improved safety envelope.
2708. A. Forbes, Canal-terrace, Aberdeen—Imp. in connecting together parts of vessels formed of tin plate, and in the means or apparatus employed therein.
2709. J. D. Welch and A. P. Welch, Gutter-lane—Imp. in machinery for blocking and pressing hats and bonnets.
2710. H. D. P. Cunningham, Bury-house, near Gosport—Imp. in working the guns and in performing other necessary work on board ships, and in apparatus employed therein.
2713. A. V. Newton, 66, Chancery-lane—Imp. in the construction of condensers or coolers. (A com.)

[*From Gazette, October* 24*th*, 1862.]

Dated 15*th July*, 1862.

2035. T. G. Ghislin, Hatton-garden—Imp. in the treatment or preparation of British and foreign algæ, and the application of the same to various branches of the arts and manufactures.

Dated 22*nd July*, 1862.

2080. A. Fournier, 18, Maddox-street, Middlesex—Imp. in the manufacture of easy chairs, seats for railway and other carriages, and other kinds of seats and mattresses.

Dated 30*th July*, 1862.

2167. W. Norman, Manchester—Imp. in tables and drawers, or othe sliding receptacles.

Dated 1*st August*, 1862.

2186. W. E. Newton, 66, Chancery-lane—Imp. in projectiles for ordnance and small arms, and in the wads or sabots to be used therewith. (A com.)

Dated 8*th August*, 1862.

2220. J. Sirou, Castellsarrazin, France—A new medicinal preparatio for internal and external application.

Dated 16*th August*, 1862.

2311. S. A. Bell, Epping-villas, Stratford, and T. Higgins, Carriaco-terrace, Bow—Improved apparatus for dipping lucife matches.

Dated 6*th September*, 1862.

2467. W. A. Richards, Chester-cottage, Cornwall-place, Holloway—An improved fastening for purses, pocket books, bags, cigar cases, books, wearing apparel, jewellery, and other articles.

Dated 16*th September*, 1862.

2542. W. Clark, 53, Chancery-lane—Imp. in the treatment of peat and peat tar for the production or manufacture of various products, and in the apparatus for the same. (A com.)

Dated 19*th September*, 1862.

2571. J. B. Giertz, Great St. Helens—Imp. in gas burners or jets.

2574. J. Imray, Bridge-road, Lambeth—Imp. in apparatus for telegraphing and signalling by means of electricity. (A com.)

Dated 23*rd September*, 1862.

2591. J. Mapple, 2, Newman's-place, Kentish-town, and D. Mapple, 3, Queen's-road, Homerton New-town—Imp. in telegraphic apparatus.

Dated 27*th September*, 1862.

2634. M. Henry, 84, Fleet-street—Certain new and improved applications of petroleum and its products, certain agents produced by combining the same with other substances, and certain modes of treating caoutchouc, gutta percha, and their compounds, and substances similar thereto. (A com.)

Dated 30*th September*, 1862.

2654. A. Prince, 4, Trafalgar-square, Charing-cross—Imp. in the manufacture of varnish, printing ink, paint, and printing colours. (A com.)

Dated 1*st October*, 1862.

2660. E. Lord, Rawtenstall, Lancashire—An imp. in power looms for weaving.

Dated 2*nd October*, 1862.

2663. W. H. Ward, 59, Packington-street—Imp. in night, day, and fog signals, and the means for effecting the same.

Dated 3*rd October*, 1862.

2672. W. Clark, 53, Chancery-lane—Improved atmospheric toy pistols and guns. (A com.)

Dated 4*th October*, 1862.

2684. J. M. Cabirol, 17, Rue du Faubourg Montmartre, Paris—A new or improved submarine lamp.

2688. W. Clark, 53, Chancery-lane—Imp. in the means of preserving goods from fire, and in apparatus for the same. (A com.)

Dated 6*th October*, 1862.

2693. T. Keech, New York—Imp. in floating batteries. (A com.)

Dated 7*th October*, 1862.

2711. J. K. Hampshire, Whittington, Derbyshire—Imp. in apparatus or machinery for washing coal, coal slack, and other mineral substances, and separating foreign particles therefrom.

2712. J. Beale, Hope-street, Maidstone, and M. A. Beale, Upper Brunswick-terrace, Barnsbury—Imp. in the preparation or manufacture of manure.

Dated 8*th October*, 1862.

2714. C. F. Terry, Sheffield—Imp. in machinery for propelling vessels.

2715. D. Nickols, Manchester—Imp. in machinery or apparatus for measuring and registering lace and other similar articles.

2716. W. C. Burden, Leicester—Imp. in mechanism for giving the pitch or tone required in tuning musical instruments, and also the key note of vocal music.

2717. T. Ratcliffe, Colne, Lancashire—Certain imp. in looms for weaving.

2718. P. Clavel, Paris—Imp. in the treatment of violet colours derived from coal tar oils.

2719. J. R. Harris, Goldington-crescent, St. Pancras-road—Imp. in propelling vessels.

Dated 9*th October*, 1862.

2721. H. Dullens, 13, Little Britain—An improved runner and fastening for umbrellas, parasols, sun shades, and other like articles.

2722. J. Maurice, 3, Langham-place, Regent-street—Imp. in steering ships or vessels, and in the apparatus to be employed for that purpose.

2723. W. Bush, Tower-hill—Imp. in cannon and small arms.

2724. C. N. Wilson, Batley Carr, near Dewsbury, Yorkshire—Imp. in rag machines.

2726. J. H. Johnson, 47, Lincoln's-inn-fields—Imp. in the manufacture of paints or pigments. (A com.)

2727. R. Hammond, 4, Trafalgar-square, Charing-cross—Imp. in armour for ships of war.

2728. A. V. Newton, 66, Chancery-lane—Improved machinery for breaking and cleaning flax, hemp, and other like fibrous substances. (A com.)

2729. J. B. Palser, Crown Hotel, Holborn—Improved apparatus for manufacturing paper pulp, and recovering the alkali used in such manufacture.

2730. G. Simons, 27, Place du Théatre, Liege, Belgium—Imp. in the manufacture of plates, rods, axles, tyres, and other articles that are required to be partly of iron and partly of steel.

Dated 10*th October*, 1862.

2731. L. Hosch, 9, Laurence Pountney-hill, Cannon-street—An imp. in the mode of constructing travelling trunks and portmanteaus.

2732. W. Schofield and S. Schofield, Ashton-under-Lyne—Imp. in apparatus for cutting button holes and other similar purposes.

2733. R. E. Green and J. Cockcroft, Accrington, Lancashire—An improved amalgamation of materials forming a substance sutable for printers' blankets, conductors used in paper making, packings for joints, and similar purposes.

2734. G. Baguley, Hanley, and H. Greener, Sunderland—An improved construction of insulator for telegraph wires.

2735. J. Lowe, Claremont-place, Old Kent-road, and J. Harris. Esshill-house, Newton Abbot, Devonshire—An improved construction of propeller.

2736. H. A. Marinoni, Rue de Vaugirard, Paris—Imp. in apparatus for fixing type in the chases.

2737. W. C. Edge, Clerkenwell—Imp. in velocipedes.

2738. D. S. Sutherland, Rio de Jancrio—Imp. in constructing beams, girders, bridges, and viaducts.

2739. W. Weallens, Newcastle-upon-Tyne—Imp. in surface ondensers for marine and other engines.

2740. T. Anderson, Glasgow—Imp. in the construction of ships vessels.

Dated 11*th October*, 1862.

2741. J. J. Shedlock, 63, Cambridge-street, Pimlico—Imp. in gas-meters.

2742. E. J. Franklin, Birmingham—A combined spring tape measure, needle case, and pin cushion.

2743. A. Vennedy, Swan Yard, Shoreditch—An improved composition for covering and forming the tips of umbrellas and parasols, also applicable to covering the ribs and stretchers of same.

2744. R. A. Brooman, 166, Fleet-street—Imp. in breech-loading fire arms. (A com.)

2745. W. Catchpool, 355, Goswell-road—Imp. in fire escapes.

2746. J. Durant, 3, Stangate-street, Westminster—Imp. in the form and construction of chimney tops or appliances for surmounting chimneys.

Patents Sealed.

[*From Gazette*, *October* 24*th*, 1862.]

October 24*th.*

1210. R. C. Mansell.
1211. P. R. Drummond.
1214. J. Elder.
1216. J. Aspinall.
1220. W. Hale.
1221. W. Fisken.
1222. L. McLachlan.
1226. T. U. Brocklehurst.
1234. H. W. Hart.
1237. A. Lester.
1243. R. Vaile.
1246. H. F. Wells.
1250. S. W. Newington.
1251. E. Clark.
1252. W. Clark.
1253. J. Ross.
1256. W. L. Tizard.
1257. D. M. Childs.
1258. D. M. Childs.
1259. D. M. Childs.
1260. E. B. Wilson.
1264. E. Moore.
1265. A. Travis and B. Travis.
1269. G. Davies.
1271. J. Maiden.
1277. J. M. Carter.
1278. A. Prince.
1279. W. Staufen.
1280. J. L. Norton.
1281. J. M. Napier.
1284. H. Willis.
1286. W. T. Loy.
1293. W. Bodden and W. Mercer.
1318. J. Fowler.
1322. C. Schlickeysen.
1328. H. Allman.
1339. E. B. Wilson.
1354. W. Clark.
1362. T. H. Hopwood.
1376. W. Riddle.
1431. T. Buckney.
1519. M. A. F. Mennons.
1894. M. A. F. Mennons.
1971. J. M. Gille.
2006. M. A. F. Mennons.
2105. T. Lemaistre.

Patents on which the Stamp Duty of £50 has been Paid.

[*From Gazette*, *October* 28*th*, 1862.]

October 20*th.*

2410. G. T. Bousfield.
2416. W. Fox and J. Willis.
2417. R. A. Brooman.
2594. T. D. Perkin.

October 21*st.*

2460. H. Phillips and J. Bannehr.

October 22*nd.*

2413. J. Avery.

October 23*rd.*

2450. J. Armour.

October 24*th.*

2474. C. Stannet.
2477. J. A. Turner.

October 25*th.*

2458. P. R. Hodge.
2461. R. A. Brooman.

Patents on which the Stamp Duty of £100 has been Paid.

[*From Gazette*, *October* 28*th*, 1862.]

October 20*th.*

2359. A. Parkes.

October 22*nd.*

2466. W. Gardner.

October 23*rd.*

2377. J. Rives.
2392. T. B. Sharp and R. Furnival.
2404. J. Hands.

October 25*th.*

2399. S. O'Regan.

LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

No. in the Register.	Date of Registration.	Title.	Name.	Address.
4517	Oct. 25	Gas Singeing Lamp	Birtles and Gottwaltz, and Thomas W. Osborne	Birmingham.
4518	,, 27	Duplex Crochet Needle and Cap	John Shrimpton and Son ...	Shedley.